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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/830,645	12/03/2001	Kazunori Fukada	FUKADA1	1868

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EXAMINER

WILKINS III, HARRY D

ART UNIT	PAPER NUMBER
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1742

8

DATE MAILED: 02/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/830,645

Applicant(s)

FUKADA, KAZUNORI

Examiner

Harry D Wilkins, III

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 April 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's admission of prior art in view of Kojima et al (JP 55-041940) and "Plasma (Ion) Nitriding".

Applicant admits as prior art (see pages 1-3) that air motors have been made having rotors, cylinders and front and rear cylinder covers. There has been a problem of wear of the surface of the members surrounding the vanes. Thus, there was a need for vane-surrounding members for air motors excellent in abrasion resistance.

Applicant's admission of prior art fails to teach the claimed method of imparting the abrasion resistance, i.e.-the nitrosulphurization process.

Kojima et al teach (see English abstract) a method of nitrosulphurizing a steel member by exposing the member to glow discharge at 400-600°C in an atmosphere of H₂S, NH₃ and H₂. Kojima et al teach (see English abstract) that the atmosphere contains 25-100 vol% of NH₃, 0.01-5 vol% H₂S and the rest being H₂. Thus, Kojima et al teach an overlapping range of composition for the gas atmosphere, except that Kojima et al teaches NH₃ and the present claims recite N₂. See MPEP 2144.05 I.

Therefore, it would have been obvious to one of ordinary skill in the art to have applied the nitrosulphurizing treatment of Kojima et al to the conventional air motor members because the process imparts superior abrasion resistance and self-lubricity to the members.

"Plasma (Ion) Nitriding" teaches the general state of the art of plasma nitriding. Particularly (see page 421, paragraph spanning 1st and 2nd columns) that nitrogen gas is typically used instead of ammonia because nitrogen gas allows for more precise control of the process and the composition of the nitrided case. "Plasma (Ion) Nitriding" teaches (see page 421, 3rd column) that the typical temperature of plasma nitriding is 375-650°C. "Plasma (Ion) Nitriding" teaches (see page 422, paragraph spanning 1st and 2nd columns) that the voltage utilized in plasma nitriding is from 200-1000V.

Therefore, it would have been obvious to one of ordinary skill in the art to have substituted nitrogen gas (N₂) for the ammonia (NH₃) taught by Kojima et al because "Plasma (Ion) Nitriding" teaches that the nitrogen gas provides more precise control of the process and composition of the nitrided case.

Regarding the parameters of temperature and DC voltage, it would have been within the expected skill of a routineer in the art to have optimized these values within the disclosed range in order to achieve the best glow-discharge thickness (for support, see "Plasma (Ion) Nitriding" at page 422, paragraph spanning 1st and 2nd columns). Changes in temperature, concentrations, or other process conditions of an old process does not impart patentability unless the recited ranges are critical, i.e., they produce a new and unexpected result. In re Aller et al (CCPA 1955) 220 F2d 454, 105 USPQ 233.

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Only result-effective variables can be optimized. In re Antonie 559 F2d 618, 195 USPQ 6 (CCPA 1977). See MPEP 2144.05 II.

Regarding claim 2, one of ordinary skill in the art would have expected the plasma nitriding of the prior art to have produced a surface hardness of 800-1200 Vickers as can be seen in Figure 8 of "Plasma (Ion) Nitriding".

Regarding claim 3, Kojima et al teach using a ratio of 5 parts of H₂S to 45 parts of the nitrogen-containing gas (NH₃) (i.e.-when H₂ is 50 vol%, H₂S is 5 vol%, leaving 45 vol% for NH₃). This is a ratio of 11.1 parts by volume H₂S based on 100 parts by volume of the nitrogen-containing gas. Therefore, it would have been obvious to one of ordinary skill in the art to have maintained the H₂S to nitrogen-containing gas ratio in order to maintain the qualities imparted by the method of Kojima et al when the nitrogen-containing gas was changed to N₂ as per "Plasma (Ion) Nitriding".

Regarding claim 4, Applicant's admission defines the parts that require the improved abrasion resistance as (see page 2, lines 6-12) the vane-surrounding members. The vane-surrounding members are defined (see page 1, lines 2-6) as being the rotor, cylinder and front and rear cylinder covers.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D Wilkins, III whose telephone number is 703-305-9927. The examiner can normally be reached on M-Th 6:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V King can be reached on 703-308-1146. The fax phone numbers for

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the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Harry D Wilkins, III
Examiner
Art Unit 1742

hdw
February 3, 2003

ROY KING 
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700